



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,707	01/15/2002	Young-Hoon Joo	5000-1-235	3893

33942 7590 04/01/2003

CHA & REITER
411 HACKENSACK AVE, 9TH FLOOR
HACKENSACK, NJ 07601

EXAMINER

CUNNINGHAM, STEPHEN C

ART UNIT	PAPER NUMBER
----------	--------------

3663

DATE MAILED: 04/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/047,707

Applicant(s)

JOO ET AL

Examiner

Stephen C. Cunningham

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terminals are not in agreement with the terminals in claim 1.

The first optical circulator transmits forward signals, received from the transmission fiber, to the first terminal of the first interleaver as claimed; and transmits reverse optical signals, received from the second terminal of the **second** interleaver, to the optical fiber.

The second circulator transmits reverse signals, received from the optical fiber to the second terminal of the first interleaver as claimed; and transmits the **forward** optical signal, received from the **first** terminal of the second interleaver, to the optical fiber.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uno et al. (JP 6-342952) In view of Radic et al.

With respect to claim 1, Uno teaches a bi-directional optical amplifier for amplifying WDM light comprising:

a first wavelength routing element (26) that combines wavelengths received at a first terminal and a second terminal and outputting a combined signal at a third terminal;

an optical fiber amplifier (10);

a second wavelength routing element (36) that splits the amplified signal, received at a third terminal, into the forward and the reverse optical signals at the first and second terminals, respectively (figure 8, abstract).

Radic teaches an optical amplifier that amplifies interleaved forward and reverse propagating signals. Interleaving forward and reverse propagating signals is beneficial because it reduces four-wave mixing. The presence of the interleaver in the apparatus suppressed both coherent and incoherent crosstalk. It would have been obvious to modify the apparatus of Uno by substituting three port interleavers for the first and second wavelength routing elements in order to route interleaved forward and reverse propagating signals through the

unidirectional amplifier in order to minimize four-wave mixing (Results and Discussion, and figure 3).

With respect to claim 2, Uno teaches an amplifier comprising:

a first optical circulator transmits forward signals, received from the transmission fiber, to the first terminal of the first wavelength routing device (modified in view of Radic to be an interleaver); and transmits reverse optical signals, received from the second terminal of the wavelength routing device (modified in view of Radic to be an interleaver), to the optical fiber; and

a second circulator transmits reverse signals, received from the optical fiber to the second terminal of the wavelength routing device (modified in view of Radic to be an interleaver); and transmits the forward optical signal, received from the first terminal of the wavelength routing device (modified in view of Radic to be an interleaver), to the optical fiber (figure 8).

With respect to claim 5, Uno teaches an optical amplifier device integrated into an optical fiber transmission system. The transmission system comprises:

an optical transmission fiber;

optical amplifier is adapted to receive forward and reverse optical signals bi-directionally from the transmission line; amplify the signals; split the amplified signals into the forward and reverse propagating signals; and transmit the forward and reverse signals via the transmission line.

It is inherent that that an optical transmission system comprises:

a first optical transmitter/receiver unit; and

a second optical transmitter/receiver unit.

Radic teaches an optical amplifier that amplifies interleaved forward and reverse propagating signals. Interleaving forward and reverse propagating signals is beneficial because it reduces four-wave mixing. The presence of the interleaver in the apparatus suppressed both coherent and incoherent crosstalk (Results and Discussion and figure 3). It would have been obvious to modify the apparatus of Uno by substituting three port interleavers for the first and second wavelength routing elements in order to route interleaved forward and reverse propagating signals through the unidirectional amplifier in order to implement an interleaved bi-directional transmission system to minimize four-wave mixing.

With respect to claim 6, Uno teaches a bi-directional optical amplifier for amplifying WDM light comprising:

a first wavelength routing element (26) that combines wavelengths received at a first terminal and a second terminal and outputting a combined signal at a third terminal;

an optical fiber amplifier (10);

a second wavelength routing element (36) that splits the amplified signal, received at a third terminal, into the forward and the reverse optical signals at the first and second terminals, respectively.

a first optical circulator transmits forward signals, received from the transmission fiber, to the first terminal of the first wavelength routing device (modified in view of Radic to be an interleaver); and transmits reverse optical

signals, received from the second terminal of the wavelength routing device (modified in view of Radic to be an interleaver), to the optical fiber; and

a second circulator transmits reverse signals, received from the optical fiber to the second terminal of the wavelength routing device (modified in view of Radic to be an interleaver); and transmits the forward optical signal, received from the first terminal of the wavelength routing device (modified in view of Radic to be an interleaver), to the optical fiber (figure 8, abstract).

Radic teaches an optical amplifier that amplifies interleaved forward and reverse propagating signals. Interleaving forward and reverse propagating signals is beneficial because it reduces four-wave mixing. The presence of the interleaver in the apparatus suppressed both coherent and incoherent crosstalk. It would have been obvious to modify the apparatus of Uno by substituting three port interleavers for the first and second wavelength routing elements in order to route interleaved forward and reverse propagating signals through the unidirectional amplifier in order to minimize four-wave mixing (Results and Discussion, figure 3).

3. Claim 3, 4, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uno et al. (JP 6-342952) In view of Radic et al. as applied to claims 1, 2 and 6 respectively above, and further in view of admitted prior art.

The applicant admits that dispersion compensation modules located adjacent to the amplifier module are well known in the art (instant application,

figures 1 and 3, and page 3, line 14 through page 5, line 10. It would have been obvious to modify the apparatus by including a dispersion compensation module adjacent to the optical amplifier in order to reduce accumulated signal dispersion.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Mizrahi

Giles

Meli et al.

Spock et al.

Berg et al.

Durgan et al.

Mitsuda et al.

Duck et al.

Kohn

Baker

Shimojoh

Park et al.

Farre et al.

Kim et al.

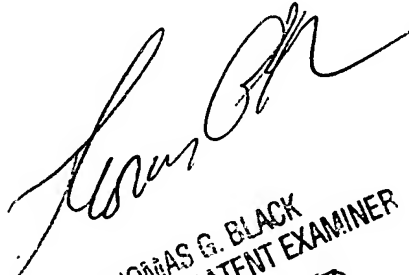
Art Unit: 3663

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen C. Cunningham whose telephone number is 703-605-4275. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on 703-305-8233. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9326 for regular communications and 703-872-9327 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

March 21, 2003


THOMAS G. BLACK
SUPERVISORY PATENT EXAMINER
GROUP 3600